UC Irvine
UC Irvine Previously Published Works

Title
Design considerations for community portals in master-planned developments in Australia and Mexico

Permalink
https://escholarship.org/uc/item/4vx1b95w

ISBN
9780980306347

Authors
Foth, M
Gonzalez, VM
Kraemer, KL

Publication Date
2008-12-01

DOI
10.1145/1517744.1517756

Copyright Information
This work is made available under the terms of a Creative Commons Attribution License, availalbe at https://creativecommons.org/licenses/by/4.0/

Peer reviewed

eScholarship.org Powered by the California Digital Library
University of California

Design Considerations for Community Portals in Master-Planned Developments in Australia and Mexico

Marcus Foth
Queensland University of Technology
Brisbane QLD 4059, Australia
m.foth@qut.edu.au

Victor M. Gonzalez
University of Manchester
Manchester M60 1QD, UK
vmgonz@manchester.ac.uk

Kenneth L. Kraemer
University of California, Irvine
Irvine CA 92697, USA
kkraemer@uci.edu

ABSTRACT
This paper presents a discussion of design considerations for community web portals as social networking systems. We analyse and compare the social interaction approach, design considerations and socio-technical requirements with regards to community portal technology employed in two master-planned urban developments in Australia and Mexico. We focus on how the human and social concepts and local contextualisations affect technology design and use. In response to our analysis, and to face the challenge of designing for variability and diversity, we present the communicative ecology model as a conceptual tool to help researchers and designers grasp the situated context and purpose of these systems in order to inform the design and development of better community technology.

Categories and Subject Descriptors
H.5.3: Group and Organization Interfaces – *collaborative computing, web-based interaction*. H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Design, Experimentation, Security, Human Factors.

Keywords
Urban informatics, master-planned communities, portals, urban computing, social networking, communicative ecology.

1. INTRODUCTION
Community portals are developed and deployed for many purposes, such as marketing and management. They can also add new ways for urban residents to interact with each other in an effort to revitalise and grow communities in urban neighbourhoods. However, Wellman argues that the availability of modern forms of transportation and the ubiquity of the Internet and mobile phones in most developed countries enable and encourage people to pursue 'personalized networking' [21]: to create and maintain both strong and weak ties with people who can be met easily face-to-face, but who do not necessarily live next door, yet still live close by.

Aurigi suggests that the term 'portal' is limiting *"people's interpretations ... to broadcasting information and providing institutional services"* [2, p. 19]. He argues for a *"need to address this tension and identify the emergence of the portal paradigm as something that has a lot to do with television and has weakened the reflection on, and construction of, a civic network. [...] But it has to be remarked how powerful and accepted the portal paradigm has become and how this type of vision can affect the shape of things to come in the augmented city"* [ibid]. Although we continue using the term 'portal', we challenge the established paradigm of its expected functionality by moving away from the expectation of a pure broadcast-only medium and analysing how close the design gets to a hybrid community information and networking system.

What sets residential community networking systems apart from their place-independent and mostly interest-based virtual counterparts is proximity, localisation and situated contextualisation. How can a community portal become a part of the toolbox that residents access to maintain their private social networks, alongside and possibly interconnected with email, phone, SMS, the web and face-to-face interaction? And how can we learn from the issues faced by previous studies [1, 12, 13] and include features that allow residents to take advantage of the communication services the Internet can offer in order to conduct personalised networking [21]. A community portal can provide access to *situated* communication and interaction partners – compared with other global communication tools, this can be a unique advantage. The portal can allow residents to meet and interact online, but also to translate and continue the online interaction into offline, real life, collocated and face-to-face interaction. This offline and place-based dimension is a key challenge in the design, development and deployment of community portals. And further, given the rapid emergence of Web 2.0 services, how relevant is it these days to design a community portal as opposed to adapting tools that are easily and freely available online? Are portals a bit of a dinosaur now?

This paper examines two case studies in Australia and Mexico. The master-planned urban development in Australia which this paper examines is the Kelvin Grove Urban Village – a joint initiative by the Queensland State Government's Department of Housing and Queensland University of Technology to create a mixed-use development. The study of this case was led by the first author. It is expected to be fully developed and occupied by 2010 at which stage it will comprise more than 1,000 residential units for more than 2,000 residents.

The development of a community portal has been placed as a key objective supporting the ICT infrastructure, social sustainability and community development strategies of the master plan that guides the development of the site. According to the marketing credo, the portal is envisioned to be a communication hub and publishing platform for community generated content to assist in the establishment of a 'vibrant new precinct, bringing together residential, educational, retail, health, recreational and business opportunities.'

OZCHI 2008, December 8-12, 2008, Cairns, QLD, Australia. Copyright the author(s) and CHISIG. Additional copies can be ordered from CHISIG (secretary@chisig.org).

OZCHI 2008 Proceedings ISBN: 0-9803063-4-5

The Mexican case study is a housing development in Tecámac, at the outskirts of Mexico City, where information technologies are used to create a new domestic and residential community concept. This case was studied by the second and third authors. The company Conectha (for Connectivity for the Habitat) – in partnership with Intel, Microsoft, the Mexican government, a local builder, and a local computer company – are creating a new generation of technology-enabled houses in a secure community for people with low and medium incomes in the City of Tecámac. The environment design approach followed by Conectha focuses on designing communities which integrate technology (e.g., wireless Internet, low cost computers, security cameras) to create a community environment that meets specific needs of consumers such as physical security, safety, local schools, electronic shopping, a community centre for entrepreneurial activities, etc.

Around 2,000 houses were built in the first phase of the project – complete with wireless capability, a computer, and free Internet access (for six months) – selling for about US$25,000. The houses are about 30 sqm or more, with 2-4 bedrooms. The community is partially walled with security and has a preschool and primary school located within so that children do not have to go outside the community for their education. The Mexican Ministry of Housing is supporting the project and providing loans for the houses. The houses are offered with a US$500 Intel-based computer manufactured by Texa, a local company in partnership with Intel. The computer is connected to the Internet by Conectha who also provide a community portal with additional services including: local information, e-mail, educational content, online ordering of groceries and other products, and access to security systems and CCTV cameras.

In this paper, we first present the background and development context of the two community portal systems. This is followed by a socio-technical analysis that covers the geographical specifics and their impact on the portal's situated design and usage; the relationship between designer-led and user-led systems innovation; the contrasting goal to design for permeability and security; and, the hybridity of embedding collective and networked interaction design features. Following our design analysis, we prepared a conceptual framework that proposes a communicative ecology model as a useful way to consolidate and integrate findings from both studies.

2. THE URBAN VILLAGE

The Kelvin Grove Urban Village (KGUV) is the Queensland Government's flagship urban renewal project. Through its Department of Housing, and in partnership with Queensland University of Technology, this 16 hectare master-planned community (Fig. 1) seeks to demonstrate best practice in sustainable, mixed-use, heterogeneous urban design. By 'linking learning with enterprise and creative industry with community,' the KGUV is designed to evolve as a diverse city fringe neighbourhood. Situated 2 km from Brisbane's CBD, it seeks to emulate a traditional village design with a town centre and shops on the main street. Since planning for the KGUV started in 2000 and construction started in 2002, AU$1 billion have already been committed to deliver an urban design that brings together infrastructure with educational, cultural, residential, health, retail, recreational and business facilities within one precinct. When completed, there will be over 8,000 sqm (GFA) of retail space and in excess of 82,000 sqm (GFA) of commercial space located throughout KGUV. In 2007, there were 375 residential units (including 155 affordable housing units) in the KGUV. This is anticipated to exceed 1,000 two-bedroom equivalent units once the Village is complete (including student and senior accommodation).

Figure 1. Kulgun Park and the café strip at The Village Centre

The KGUV is seen as a significant showcase of Queensland's emerging information economy, designed to provide opportunities to integrate work and home through high-speed communication systems for both local businesses and residents. The ICT infrastructure features a 'triple-play' fibre network providing telephone, television and data services including a 'peering link' allowing QUT students living in the KGUV to access the university's online resources from their home computers at no charge. The services can include low or nil cost large bandwidths (for example, Internet Protocol at 100 Mbits/s) within and between points in the KGUV, fibre or wireless network access and quality of service management for multimedia over Internet Protocol. Internet and world wide web access are at commercial broadband speeds and prices. The fibre network is complemented by wireless services allowing subscribers to access the Internet in parks, cafés and other locations around the KGUV. The implementation of the AU$700,000 infrastructure investment started in 2005. These pipes, wires, ducts and antennas provide the technical connectivity, yet the majority of the infrastructure and certainly the social effect is invisible or unnoticeable. The communication strategies and policies in the KGUV master plan thus call for ideas and strategies to enable, foster and showcase the social benefits of this infrastructure 'beyond access' [9, 23].

The diverse interests of this research program are grouped under the collective umbrella of *New Media in the Urban Village*. Since 2006, a mix of established and experimental data collection methods have been employed including surveys, interviews, focus groups and digital media workshops with KGUV urban planners, residents, visitors and workers. The Department of Housing acknowledges that the strategic design of the built environment and access to the ICT infrastructure are necessary but not sufficient to ensure 'effective use' [11] or social sustainability. Therefore the master plan called for the design and development of a community portal that is situated on the applications layer of this infrastructure. The primary objective of the KGUV community portal (www.mykelvingrove.com.au) is to help achieve these ambitions and to drive the delivery of the community identity and spirit articulated in the vision of the master plan. It aims to provide an online

mechanism to link the people and businesses that 'live, learn, work and play' at the KGUV, including residents of the KGUV and nearby areas (including affordable housing residents, seniors and students); university staff and students living and / or studying in the KGUV and nearby areas; businesses and their customers; and visitors. The design and implementation was guided by a number of key objectives. The portal is intended to encourage participation in the KGUV by being a key information resource of the mix of activities, programs and facilities available. It also seeks to facilitate community uptake of ICT by hosting entertainment and information content that encourages exploration of the ICT infrastructure available at the KGUV.

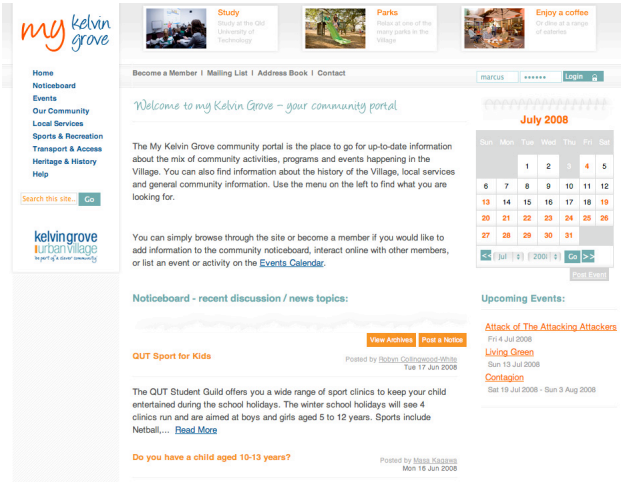

Figure 2. The mykelvingrove.com.au portal homepage

The development of the community portal was executed independently of this study by a web design business commissioned by the KGUV community development committee. The portal site in its present form (Fig. 2) features a noticeboard for registered users to upload content such as business promotions, collective announcements, community events and group activities. It also includes an online calendar as a central repository of events, activities and programs occurring at KGUV, such as, the theatre program, public university events and exhibitions, community association organised activities, retail promotions, well-being activities and completion dates for construction. Event entries that appear on this calendar can be submitted by registered users. In addition, the portal lists local services with maps, contact details and web links, as well as information on sports and recreational facilities, transport and accessibility advice, and a section on the site's heritage and history.

3. REAL DEL SOL

In the city of Tecámac, Mexico, Real Paraiso Residencial, a housing company in partnership with Conectha, an Internet Service Provider, built a residential complex (Real del Sol) consisting of around 2,000 houses equipped with a personal computer and broadband Internet access. By the end of February 2006, with the support of the aforementioned companies, this three-year study commenced with families living in or about to move into Real del Sol. The general purpose of this study was to analyse the way that this particular vision of home computing becomes materialized and socially constructed over time as a product of the interactions between neighbours, developers, and designers. Among other factors, the study explores the symbolic meaning of technologies in domestic settings, the role of technologies in supporting neighbourhood organization and management, and the integration of technological services into the daily practices of urban families. The study of Real del Sol focused on following 16 families over a period of three years. Interviews were conducted every year with members of the household and communication with them was maintained by e-mail or phone between interviews.

Real del Sol housing development is located in the city of Tecámac. Although Tecámac is not part of the metropolitan area of Mexico City, it is close enough to allow for a reasonable commute to the city (approximately one hour driving, with good traffic conditions), since the majority of residents work there. The development offers three small parks, basketball courts, a secondary school, a primary school, a kindergarten, and other communal areas. To facilitate the estate's administration, the development is organized into *privadas*, groups of ten or twenty houses that are separated by gates. Residents in the *privadas* share some green areas and services (e.g., trash bins). Each house comes with standard utility services (e.g., water, electricity, gas), including Internet access through a wireless network that allows speeds up to 384 Kbps. Houses also include a personal computer for free or it is offered by Conectha at preferential prices. Figure 3 shows pictures of the development.

Figure 3. Houses in Real del Sol and the public park

The developers of Real del Sol aimed at creating a particular household concept called 'Habitat of Seventh Generation' or G7 Habitat, which include seven elements: innovative design, financing support, post-sale support, connectivity, school link, shopping link and security. Each element serve to shape the design of the houses and the community in general, and many of them were in practice materialized and provided through a community intranet portal.

The Real del Sol portal has been in operation from the beginning of the development and any resident obtains access to it as soon as they move in. The portal was initially organized into a number of sections including community information and announcements, links to educational content, online ordering of groceries from local shops, and access to public security cameras placed around the complex. The portal has been experiencing a number of changes over the years, and some services have been updated, others temporarily available, and others emerged as a result of developers identifying new needs. The current version includes all the services listed before, and others such as lists of recommended local shops and providers, job banks, entertainment and instructional videos. Figure 4 shows a screenshot of the latest version of the portal.

Supplementing the portal, and as an initiative emerging from residents volunteering their time, Real del Sol counts with a paper-based monthly bulletin, La Plaza, which is distributed for free to all the households. La Plaza, includes reportages of events held in Real de Sol and Tecámac, interviews with notable residents, educational articles and commercial announcements. The bulletin and the intranet complement each other and are used and valued by residents in different ways.

Figure 4. Portal of Real del Sol

The success of Real del Sol's intranet as a community communication and information tools has been modest and fluctuated over time. This can be in part due to Conectha never seeing the intranet as a final product, but more like a platform for innovation, where improvements and changes have been constant. For instance, the tools provided to support communication among neighbours, which at the beginning consisted of a simple page where residents could post messages, has evolved more recently into a complete system for the administration and organization of each *privada*. Using the system, the residents can record and check the payment of maintenance fees, post information and messages, and coordinate projects with their neighbours such as painting the parking spaces, or planting new trees. Consequently, while the first version of the system was hardly used by neighbour for communicating among them, this new version is frequently used by the presidents of the *privada* to keep a shared record that makes their administration visible to all residents, avoiding misunderstanding with regards to how resources are used for the projects.

We also noticed that some services of the Real del Sol portal were popular at the beginning when the residents just moved in and eventually became less used. This was the case with the shopping link through which residents had access to a local pharmacy, butchery and a small convenience store. This service was particularly relevant and useful during the initial stage when families were settling in because they did not know what other alternatives were around and did not have time to look for them. Once the residents settled in, they did not use the service anymore. They mentioned that they preferred to see the groceries they shop, and many times they just find the whole experience of going out and shopping more enjoyable. In contrast with this, the new service, just listing recommended shops and providers in the area of Tecámac, is appreciated by the residents, who report to use it regularly. In summary, this study found that the portal's appropriation experienced by residents of Real del Sol has been evolving and responding to the need for adapting the services to the current needs of residents.

4. SOCIO-TECHNICAL ANALYSIS

In this section we analyse our research data and observations across a number of key characteristics. In order to situate and contextualise our discussion with an appreciation of geographical and local differences, we summarise the different housing situations in each country, and point to urban policies and the socio-cultural aspects that pertain to living in these urban environments. Recognising that the use of technology is driven by various goals in each development, we highlight these objectives and associated challenges from a designer and user perspective. One of the main contrasting insights presents itself by looking at how both case study sites are differently positioned on a scale between permeability and security. Another dichotomy that we explore is between design for collective versus network interaction.

4.1 Australia vs Mexico

South East Queensland, the area surrounding Brisbane, is globally ranked only second to Phoenix in the USA in terms of its urban growth rate. Current projections estimate an additional 50,000 new residents for South East Queensland per year with a total of 3.71 million people by 2026 [18]. The KGUV urban development project is a response to compact city policies that call for the densification of the existing urban footprint. Apartments in low to medium rise vertical real estate are the predominant residential product being built at the KGUV – with a complete absence of typical 'Queenslander' houses on a stand-alone lot with mango trees and a swimming pool.

The KGUV breaks urban development conventions by introducing a mixed-use, heterogeneous design that combines residential, educational, retail and leisure facilities, as well as different residential products such as penthouses, student and seniors accommodation, and affordable housing. The KGUV and its residents and visitors are characterised by diversity. Following Florida [6] and Wood and Landry [22], diversity is considered beneficial and has to be embraced not as an obstacle but as a unique advantage in the development of the KGUV generally, and in the design of the community portal specifically. People of different age groups, backgrounds, interests, skills and stories are collocated here. However, physical proximity does not ensure social compatibility. This heterogeneous environment requires a similarly heterogeneous and flexible portal design, since it is difficult to meet the breadth of needs and expectations with a single design solution.

Different to the Mexican case, the current KGUV portal design does not include the ability to access unique place-based functions such as CCTV camera control or the management of body corporate affairs. Such functions not available anywhere else on the web for this particular place could give the portal its required *raison d'être*. However, in its current conception, the portal is mainly limited to information about local events and services. This narrow common denominator is not sufficient to sustain interest and usage over the long term. In order to fulfil the vision of providing the 'social glue' that connects residents with each other and brings the urban village to life, the portal needs to be embedded in the local communicative ecology with links to other established media and social networks.

The situation in Mexico is different. Following international trends, over the last few years, Mexico has experienced an unprecedented investment to build housing complexes that are affordable, particularly for the low and middle-income population. By 2004, the housing shortage was estimated in excess of 5 million units, and the Federal Mexican Government established the goal of building no less than 750,000 units every year to satisfy the demand [20]. In 2006, at the end of the previous administration, the Mexican federal government reported that 1.9 million new houses were built between 2002 and 2006, which fell below the target but represented 43% more than those built in the previous administration [10]. Most of the housing developments in Mexico have aimed at providing hous-

ing through simplified mortgage models, financial instruments, and securitization schemes provided by private and government institutions.

Developers of Real de Sol seek to sell the properties to a particular type of customer. They wanted to achieve those aspiring for a better standard of life, people who wanted to improve their conditions and live around others thinking alike. The type and price of houses worked to attract this type of customers, but there were also some other mechanisms used for these purposes. For instance, properties were sold to people that were planning to live in the development, and not to those that just wanted to buy an investment property to rent out. Real del Sol sales agents were also clear with potential clients with regards to the exclusive use of the property as a household and the prohibition of transforming it, or part of it, into a retail outlet. The price of the properties (starting at US$25,000) made them affordable for low-middle (social sector) and middle class (economic sector) families, with starting average incomes per household of about US$1000 per month. Consequently, residents of Real del Sol are mostly young families, working as technicians, professionals or running their own small business; all with similar perspectives with regards to the expected standards of living. Most of them commute every day to Mexico City and were living there before moving. This created a residential community which to some extent is homogeneous and with a desire to move up in the position along the socio-economic hierarchy.

The Real del Sol portal was designed from the beginning assuming this particular type of residents. Services were defined to work for families that were new to the area (e.g. shopping services, business directories), where one or all adults were away from home most of the day (e.g. security cameras), and with educational needs for adults or children. These characteristics were attractive for those seeing the portal the first time, although, as we have explained before, the actual use after moving in was not extensive. Nevertheless, in spite of the changes experienced, the typical resident persona used by the portal's designers, remains unchanged.

4.2 Technical vs Social Drivers

Since the KGUV portal has only been online for less than a year, our analysis in this section focuses on the design phase, whereas the Real del Sol portal has been operating for much longer, our analysis there draws on usage patterns. The design of the KGUV portal was driven by the master plan's community development and information technology strategies. The master plan outlines a long term urban development process that spans over a decade of planning and construction. The timeframe for a technology product such as the portal on the other hand is more likely to be measured in months rather than years. The problem that emerged from this discrepancy between the underlying timeframes is the difficulty of anticipating future technology progress and trends and meeting social demand. The portal was originally envisioned five to six years before its design could commence. As a result, the original specifications and budget allocation put constraints on ensuring that it would meet its desired purpose as well as compete and sustain itself in today's Web 2.0 era.

Furthermore, the lead partners, a government entity and a university, are legally obliged to follow certain policies and procedures that presented additional complications. Fulfilling social demands of allowing portal users to post their own content such as announcements, events, buy & sell items, had to be embedded in a rather complex framework of usage terms and conditions created by the partners' internal legal advisory team and vetted by Crown Law. The slightly milder version of the 'Acceptable Use Policy' that has now been published online is certainly necessary from a public policy perspective, but still a deterring obstacle when the design goal is to encourage participation without the need for rigorous content moderation.

The experience of the socio-technical drivers behind the Real del Sol portal are more favourable. The vision behind Real del Sol was to create a novel housing concept where information technology would not just play a central role, but would be part of the very definition of what constitutes a house. Materialized as the G6 Habitat concept, the vision included building a new generation of houses where computers and Internet access become a part of the basic infrastructure.

At Real del Sol, the G7 Habitat concept soon moved from being a marketing tool influencing the purchase decision, to become a symbolic differentiator for the community and its residents. Through our study, we were able to see how the G7 Habitat concept determined resident's expectations about their life at the development, the role played by information technologies, and the nature of their interaction with those technologies. Through interviews, we saw how residents were aware that they did not just purchase a house, but a complete community concept, which demanded cooperation with others and the establishment of social norms. Furthermore, people developed a sense of familiarity with the technology, where the assumption was that all houses were Internet-enabled, and, regardless of use, people were aware that there was a portal serving their community, as well as CCTV cameras operating 24/7 accessible through the portal. Residents then took for granted that the technology was available, and that it was an important ingredient to navigate and negotiate the community they lived in. In other words, people develop a sense of pride around the fact that they lived in a digitally augmented community and that Real del Sol was a unique housing development.

Beyond the symbolic meaning and appropriation of the G7 concept, some of the services provided experienced novel use that were beyond the designer's expectations. Such is the case with the video security cameras. Although the main purpose of these cameras was to provide security, their limitations and the fact that people can access them from anywhere resulted in novel usages. For instance, some residents we interviewed mentioned using the cameras for coordination with other members of their family either living in the same household or far away. In one case, the single mother of two teenagers uses the camera to monitor the arrival of their children from the school while working from her office. In another case, a family with two small girls gave access to the cameras by sharing the password with their grandmother living in California (USA). By watching the video she can monitor when the family arrived in the evening and then phone them. This obviously worked as a mechanism to avoid wasting time if the family was away. Interestingly, most residents at some point have used the cameras with the purpose of showing others where they live. Many interviewees mentioned that while visiting families in other cities, they accessed the portal and the cameras and show other people the public parks, their *privada* and other common areas. It was evident that residents felt proud and wanted to show off their property, but also their ability to access these cameras, emphasizing the community's unique use of technology.

The previous examples of technology appropriation show how in Real del Sol, as people had opportunity and a certain degree of flexibility to play with the technology, they innovated and created new uses for it. Interestingly, Conectha designers are aware of these novel uses, and happy with them. We have noticed that even the sales people, when presenting the properties to potential clients, point to the cameras and make emphasis on the possibility of using them for purposes as the ones described above.

It is important to observe that when Conectha designers worked on the definition of the portal, and as they have been progressing over time, one of the main decision points has been whether to use generic-purpose technologies freely available over the Internet or to build a unique, distinct and access controlled space by themselves. All along the study, the decision remained on building the infrastructure by themselves. They wanted to have complete control over the user experience and considered that opening using an alternative site using a public space such as Yahoo Groups, or similar, would prevent them from creating a sense of community, implementing the services they wanted to provide (controlled access to video cameras and online shopping), and reduce their chances of experimenting with the technology as required.

4.3 Permeability vs Security

KGUV is not a greenfield development, rather it is an urban renewal initiative of an inner-city site that is surrounded by an existing and organically grown suburb. Avoiding creating a gated community that would risk being rejected by its surroundings, one of the key urban design goals – reinforced by the rhetoric of the master plan – was permeability. This term is used to describe an open, trustworthy, welcoming and inclusive quality of the KGUV that would allow it to easily integrate with the existing neigbourhood. This urban design goal not only negates the need for a gate around KGUV, it also translates into social design goals to provide opportunities for old and new residents to meet and to improve the accessibility of the site for visitors and customers of the retailers. It is also reflected in the portal design. The domain name 'mykelvingrove' was specifically chosen to include the wider neighbourhood of the entire suburb, rather than residents of the KGUV site only. As well, the portal has a public homepage and most information is available to non-registered users, too.

However, permeability and the absence of a gate (around the KGUV or virtually 'around the portal') proves to complicate efforts to establish a sense of community and a village identity. The Latin inscription of the medieval Holsten Gate of Lübeck, Germany – 'concordia domi foris pax' or 'unity at home, peace abroad' – reminds us of the symbolic function of a gate, town wall or in fact, a password protected intranet to indicate the 'inside' and the 'outside' of the town. Beyond the primary security concern, it helps to clarify membership and feelings of belonging as 'one of us'. High barriers of entry not only function as a security means to repel unwanted intruders, they also act as a symbolic embrace of those that have been admitted into the inside. In the case of the KGUV portal, the design is torn between permeability on the one hand, and a desire to achieve a village community on the other.

Looking at the appearance of Real del Sol, there is no physical gate, but living in a safe and secure housing environment is a priority for most inhabitants of housing developments in urban Mexico [3]. Consequently, one of the elements of the G7 Habitat concept was to provide some form of security for residents. With this purpose, developers installed video cameras all over the complex, covering each group of houses (*privada*) separately, as well as most public areas of the residential complex. All residents have access to the cameras through the community intranet. Designers foresaw residents using the cameras to monitor activity outside their properties, as well as the four communal areas.

In practice, the use of cameras for security purposes was not as successful as expected, and as we have explained before, people found novel uses. Nevertheless they are a symbol of Real del Sol resident's concerns with security. People want better cameras and many *privadas* have discussed plans to add more and other additional security systems such as alarms. Many *privadas*, which are walled, after the first year, installed electrified fences. At that time there were some robberies in the community and people were afraid.

The physical characteristics of the development, constituted by gated *privadas*, have created a sense of separation between the *privadas* and the rest of the community. Interviewees often pointed to their struggles to coordinate activities and projects at the development level, and many more successes when dealing with their own neighbours. This is not just the result of numbers, but as a result of a more cohesive structure developed from all members of the privada living behind the same gates. Separation exists also between the entire Real del Sol complex and the rest of the municipality. In this case the separation is not physical, as the complex itself is not walled; here the separation is a reflection on the design and physical characteristics of the development which clearly contrasts with all the construction happening around it.

4.4 Collective vs Network Sociality

Building on the work by Arnold, Gibbs and Wright [1] we find it useful to distinguish between collective interaction for discussion *about* place and networked interaction for sociability *in* place. The community portals at Kelvin Grove and at Real del Sol both include public discussion forums, noticeboards, events calendars and content management services. These functions are mostly designed to support *collective interaction for discussion about places* that promote a one-to-many or many-to-many broadcast mode of communication. They complement collective community activities and could extend to place-based community activism around issues such as neighbourhood watches, traffic calming, rent increases, body corporate affairs and street rejuvenation initiatives. Activities and interactions around such place-based interests may be able to fuel social interaction for a while. Yet, portals that are solely based on a collective interaction paradigm require a continuous effort to reach and sustain a critical mass of users. This is often considered to be a key criterion of success, and critical mass has been reported as one of the most common stumbling blocks for such systems: 'if you build it, they will not necessarily come' [15, p. 19].

The residents of Real del Sol rely on their portal to access certain unique and password-secured features we outlined above. In an attempt to design for permeability, the KGUV portal avoids such unique features. Furthermore, residents of KGUV are collocated not on the basis of shared interest or a common demographic quality. In fact, one of the guiding design principles is heterogeneity of housing types to encourage an inclusive collocation of 'mainstream' residents of various age and income groups together with student and seniors accommodation as

well as affordable housing options for low-income earners. Although place-based initiatives and collective activities present valid motivations for neighbourhood interaction, we argue that there can be other, more inherently social reasons. Analysing the interaction paradigm of social networking systems such as Facebook and instant messaging shows that a network interaction paradigm may turn the problem – lack of a single shared place-based interest – into an advantage: social diversity.

Our previous research found that – despite not knowing many of their neighbours – urban residents believe that it is very likely that within the diversity of residents living in the same neighbourhood, there may be some who they might be socially compatible with, alas certainly not all of them [8]. Yet, apart from serendipitous encounters, there are no convenient means to find out if they are. The portal could become a way to enable, enhance, augment or facilitate existing or emerging social networks between urban residents in conjunction with other tools and services they use. This *networked interaction for sociability in place* describes the more private space occupied by a 'society of friendships', that is, social networks of friends who live within relative proximity to each other. They use informal peer-to-peer type of network communication tools such as email, SMS and instant messaging to interact online, but proximity enables them to gather face-to-face and interact offline. They see each other primarily as 'friends who live nearby' and not as 'neighbours.' If we regard the urban environment as an opportunity space [14], one of the key challenges of the portal design is thus to find appropriate means to afford residents a seamless and voluntary pathway to transition from 'neighbour' to 'friend' and to link these new nodes with their existing social networks.

5. COMMUNICATIVE ECOLOGY

Our socio-technical analysis covered a number of key aspects that have a significant impact on the design, uptake and usage of the two portal systems we examined. In the following we introduce a conceptual framework that may be useful to make sense of our findings and experiences with a view to integrate these diverse factors into future design considerations. The objective to design and deploy a community portal with interactive features that seamlessly integrate into the existing communication mix of urban residents requires a holistic perspective. The portal must not be considered in isolation but in the situated context of other communication technology employed by residents, other social relationships they maintain, and other types of information flows they engage in.

We respond to this design challenge by invoking the concept of *communicative ecologies*. We define a communicative ecology as a milieu of agents who are connected in various ways by various media making exchanges in various ways [8]. Tacchi, Slater and Hearn [19, p. 17] suggest communicative ecologies are the *"processes that involve a mix of media, organised in specific ways, through which people connect with their social networks."* An ecology operates as a 'web of life;' the communicative ecology framework opens up the possibility of network analyses of relationships between agents in the ecology. It refers to the context in which the communication process occurs. Such an ecology can thus be thought of as comprising a number of mediated and unmediated forms of communication.

We find it useful to conceive of a communicative ecology as having three layers: a *technological layer,* which consists of the devices and connecting media that enable communication and interaction (including the portal); a *social* layer, which consists of people and social modes of organising those people – which might include, for example, everything from informal social networks to more formal community associations, as well as commercial or legal entities such as body corporates; and a *discursive* layer, which represents the content and information flow, that is, the ideas or themes that constitute the conversations and narratives of the ecology.

Furthermore, our analysis above started to explore various dimensions of the communicative ecology, that is, the extent to which technical, social and discursive elements are positioned between (1) online and offline communication modi, (2) local and global contexts, and (3) collective and networked interaction paradigms. First, the online vs. offline dichotomy is blurring. Mesch and Levanon [16] report that social networks that individuals generate and maintain with the help of ICT, transcend from online to offline and from offline to online seamlessly. Secondly, the local-global axis is increasingly being occupied on the global end of the scale by a range of major and powerful Web 2.0 services such as search engines, instant messenger networks, auction sites and social networking systems. The community portal should not replicate services that compete with existing global sites or with global content. Instead, it is useful to seize opportunities for local (and location-aware) services as well as locally produced and consumed content for which the community portal can provide a platform [4, 5]. Additionally, the portal, as a new media platform, can cohabit with 'old' media (e.g. paper supplement), and use the affordances of each to cover different needs.

The third implication refers to the aforementioned discussion of collective and networked interaction paradigms. The community portal must be structured to allow for collective community interaction for discussion about place ('community activism') and networked community interaction for sociability in place ('social networking'). Collective interaction relates to the place in which residents are collocated and stems from the shared interest in and common purpose of the urban neighbourhood site itself. Portal features that support this aspect include body corporate affairs, community events, street rejuvenation initiatives and lobbying activity. Features to support collective interaction are a common and necessary component of most community portals. However, they are not sufficient to ensure social sustainability. Features that support networked interaction seek to raise awareness of who lives in the neighbourhood, provide opportunities for residents to find out about each other and voluntarily initiate contact with selected residents of choice. A modular design that allows for mash-ups with successful Web 2.0 services such as Google Maps or Facebook would foster 'glocalization' [21]. If place-based issues arise, residents can migrate into the collective domain of a community intranet or discussion board to organise meetings and action. Some residents may be inclined to employ the 'group' feature of social networking sites to organise community activism. At the same time, such initiatives can provide opportunities to hold local events and meet new residents and to migrate back into the domain of private network sociality. Residents get to know each other and find out who they are or are not socially compatible with. Our observations show that both types of sociality can co-exist and benefit from each other. We argue that it is desirable to structure the portal's interaction design to allow for easy and seamless transitioning between collective and networked types of sociality of community interaction [7]. Following Postill [17], we further note that more than two types of sociality may be useful to consider in future conceptual designs.

6. CONCLUSION

We presented two case studies of community web portals designed to support the everyday communication and interaction requirements of residents living in master-planned communities in Australia and Mexico. Our socio-technical analysis highlighted the need for a situated contextualisation of the urban environment to inform the design process. We examined geographic characteristics and pointed to the need to consider the occurrence of both designer-led and user-led innovations. The contrasting relationship between designing for permeability and security was explored specifically.

Our discussion shows that the portal designs we studied have to fulfil different needs to different people at different times. Being able to limit the variables at the outset will make the life of the designer easier, but in reality, variability and diversity are not only a necessity of life but also, we argue, a crucial advantage. In order to appreciate this advantage, we introduced communicative ecology as a conceptual response to the challenge of taking variability and diversity into account in the design process. Situating the development within this framework produces design implications that seek to ensure the community portal is of value to residents and users. By taking all significant elements of the communicative ecology into account, design implications can be derived which will guide the portal development.

The communication modi afforded by Internet and Web 2.0 applications are becoming a well-established part of the communication mix people employ to maintain their social networks. Thus, the portal design needs to allow for interoperability with other communication technologies. If the portal is able to add value to the existing portfolio of devices and services residents employ, it has a chance of becoming an attractive addition or enhancement to the existing communicative ecology. However, the dynamic development in the Web 2.0 era sees a plethora of new tools and services arrive and disappear rapidly. We regard the communicative ecology model as a helpful aid for researchers and designers to grasp the wider context and purpose of these systems in order to inform the design and development of better community technology.

7. ACKNOWLEDGEMENTS

The KGUV research is supported under the Australian Research Council's Discovery Projects funding scheme (DP0663854) and Dr Marcus Foth is the recipient of an Australian Postdoctoral Fellowship. The Tecamac research is supported by a grant from the University of California Institute for Mexico and the United States (UCMEXUS). The authors would like to thank Helen Klaebe, Greg Hearn, Barbara Adkins, Angela Button, Sergio Leal, Juan Larrauri and Jose Dibella for supporting these research projects, and the anonymous reviewers for valuable comments on earlier versions of this paper.

8. REFERENCES

1. Arnold, M., Gibbs, M.R. and Wright, P. Intranets and Local Community: 'Yes, an intranet is all very well, but do we still get free beer and a barbeque?'. in Huysman, M., Wenger, E. and Wulf, V. eds. *Proceedings Communities and Technologies*, Kluwer, Amsterdam, 2003, 185-204.
2. Aurigi, A. New Technologies, Same Dilemmas: Policy and Design Issues for the Augmented City. *Journal of Urban Technology*, *13* (3). 5-28.
3. Bergman, M. Crime and Citizen Security in Latin America: The Challenges for New Scholarship. *Latin American Research Review*, *41* (2). 213-227.
4. Berry, R. and McLaughlin, D. (eds.). *Localism and the information society*. Knowledge Politics, London, 2007.
5. Davies, W. Proxicommunication: ICT and the Local Public Realm, The Work Foundation, London, 2004.
6. Florida, R.L. Cities and the Creative Class. *City and Community*, *2* (1). 3-19.
7. Foth, M., Choi, J.H.-j., Bilandzic, M. and Satchell, C., Collective and Network Sociality in an Urban Village. in *MindTrek*, (Tampere, Finland, 2008).
8. Foth, M. and Hearn, G. Networked Individualism of Urban Residents: Discovering the communicative ecology in inner-city apartment buildings. *Information, Communication & Society*, *10* (5). 749-772.
9. Foth, M. and Podkalicka, A. Communication Policies for Urban Village Connections: Beyond Access? in Papandrea, F. and Armstrong, M. eds. *Proceedings Communications Policy & Research Forum*, Sydney, NSW, 2007, 356-369.
10. Fox, V. Sexto Informe de Gobierno, Presidencia de la República, Gobierno de Mexico, 2006.
11. Gurstein, M. Effective use: A community informatics strategy beyond the digital divide. *First Monday*, *8* (12).
12. Hampton, K.N. Neighborhoods in the Network Society: The e-Neighbors study. *Information, Communication & Society*, *10* (5). 714-748.
13. Hopkins, L. Making a Community Network Sustainable: The Future of the Wired High Rise. *The Information Society*, *21* (5). 379-384.
14. Hornecker, E., Halloran, J., Fitzpatrick, G., Weal, M., Millard, D., Michaelides, D., Cruickshank, D. and De Roure, D., UbiComp in Opportunity Spaces: Challenges for Participatory Design. in *Participatory Design Conference (PDC)*, (Trento, Italy, 2006), 47-56.
15. Maloney-Krichmar, D., Abras, C. and Preece, J., Revitalizing an Online Community. in *Symposium on Technology and Society (ISTAS) – Social Implications of Information and Communication Technology*, (Raleigh, NC, 2002).
16. Mesch, G.S. and Levanon, Y. Community Networking and Locally-Based Social Ties in Two Suburban Localities. *City and Community*, *2* (4). 335-351.
17. Postill, J. Localizing the internet beyond communities and networks. *New Media & Society*, *10* (3). 413-431.
18. Queensland Government. South East Queensland Regional Plan 2005 - 2026, Office of Urban Mgt, Dept of Local Government, Planning, Sport and Recreation, Brisbane, 2005.
19. Tacchi, J., Slater, D. and Hearn, G. *Ethnographic Action Research Handbook*. UNESCO, New Delhi, India, 2003.
20. Topelson, S. Current Housing Situation in Mexico, Centro de Investigacion y Documentacion de la Casa and Sociedad Hipotecaria Federal, 2005.
21. Wellman, B. Little Boxes, Glocalization, and Networked Individualism. in Tanabe, M., van den Besselaar, P. and Ishida, T. eds. *Digital Cities II*, Springer, 2002, 10-25.
22. Wood, P. and Landry, C. *The Intercultural City: Planning for Diversity Advantage*. Earthscan, London, 2007.
23. Young, G.T., Foth, M. and Matthes, N.Y. Virtual Fish: Visual Evidence of Connectivity in a Master-Planned Urban Community. in Thomas, B. and Billinghurst, M. eds. *Proceedings of OZCHI 2007*, University of South Australia, Adelaide, SA, 2007, 219-222.